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ABSTRACT

This study focuses on the effects of family size and spacing on intellectual, social, and personality development of children. The sample consisted of 533 suburban, middle class, large family (five or more) and small two child family children. The children, 233 boys and 300 girls, were teenagers attending either junior or senior high school. Spacing was measured as spacing to the next oldest and spacing to the next youngest. Spacing measures were divided into three categories: close (18 months or less); medium (19 to 30 months); and distant (more than 30 months). Standardized intelligence scores, the Test of Effective Academic Motivation, the Cattell High School Personality Questionnaire, questions about their participation in clubs, level of occupational aspiration, job orientation, and other personality scales were used. Conclusions show that the more closely spaced younger child was found to be less intelligent. However, these closely spaced children were also found to belong to more athletic teams, to be more interested in getting a job, to be more ambitious occupationally, to be more self-sufficient, more serious, and more relaxed about protocol. Most of these findings were significant only for large family children, spacing having less effect in children from two child families. (Author/JK)

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BEING A CLOSELY SPACED SECOND CHILD IS NOT SO BAD
Child-Spacing Effects on Intelligence, Personality, and Social Competence.

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Child-Spacing Effects on Intelligence, Personality, and Social Competence

A recent theory developed by Zajonc and Markus (1975) has related the intelligence of children to a function of family size, birth order, and spacing. The model employed by Zajonc and Marcus assumes that the intelligence of a child is affected by the intellectual climate of the family. The most favorable intellectual climate is experienced by children from small families, older children, and distantly spaced children. The application of this model can be illustrated simply. Let us take the case of a second child (i.e., one who is born into a family which already has one child). Let us assume that both of the parents have scores of 30 on absolute intelligence, that a one year old child has a score of 1 on absolute intelligence (absolute means not corrected for chronological age), and, furthermore, that a five year old child has an absolute intelligence of 5. The actual numbers are not so important as their relative size. Now a new-born child coming into a family wherein the oldest child is only one year old is coming into a family with a total intellectuality of 30 + 30 + 0 = 61, or with an average intellectual climate of 61 ÷ 4 = 12.5.

Now, on the other hand, a second child who is born into a family wherein the first-born child is already five years old would be coming into a family with a total intellectuality of 30 + 30 + 5 + 0 = 65 and an average intellectual climate of 65 ÷ 4 = 16.3. Thus the second child coming into a family with wide age spacing tends to find a richer intellectual climate, and should develop his or her own intellectual capabilities faster and hence become more intelligent as an adult.

A review of the literature revealed a dearth of other studies dealing with the effects of child spacing on children. Koch (1954) was one of the first investigators to be interested in the association of spacing patterns and sex

of siblings on the cognitive abilities of children. Using six year olds, she included the eight possible positions in two-child families with sibling spacing 0-2 years, 3-4 years, and 5-6 years.

She found a differential sex effect in that distant spacing was favorable for the cognitive development of males, while close spacing was favorable for females. She also found girls with brothers achieved higher scores on intellectual performance than did girls with sisters, while boys in general were not affected by the sex of their siblings. Thus Koch found that in addition to family size, birth order, and spacing, the sex of the sibling(s) was an important factor in the cognitive development of a child.

Sutton-Smith and Rosenberg suggest in The Sibling (1970) a sex role differentiation explanation for the effects found by Koch. They propose that for girls being close in age to a sister facilitates dependency, which tends to enhance intellectual development in girls. However closely spaced boys suffer from the degree of competition engendered when spacing is close, and are better off when widely separated in age from the next sibling.

While this work does not concencentrate solely on spacing, several studies are discussed in which this variable was salient. For instance, Rosenberg, Goldman, and Sutton-Smith (1969) replicated Koch's study using fourth, fifth, and sixth graders in two-child families and using age spacing between siblings from one to six years. Their results indicated that, for females, having a male close in age led to higher intelligence, whereas having a female sibling close in age had the opposite effect. However, a replication of the study by Rosenberg and Sutton-Smith (1969) with male and female undergraduates obtained contradictory results. In young adulthood the favorable effect on males of being first born and having large age spacings

was still influential, but for females ordinal position was not significant, and like-sex siblings and closer age spacing were more favorable.

This study focuses on the effects of family size and spacing in the social and personality development of children. We feel that while the Zajonc and Marcus model provides reasonable explanation for the effects of child spacing on intelligence, its generalization to other aspects of a child's life such as social and personality development remains to be tested. However due to the smallness of our sample we did not examine the sex interaction effects found by Koch (1954) and Sutton-Smith and Rosenberg (1970).

The hypotheses that guided our study were that younger children who were closely spaced to their older siblings would belong to more athletic teams, would prefer occupational to academic interests, would have higher occupational aspirations, and would be more obedient and self-sufficient than younger children who were distantly or medium spaced.

The rationale for these hypotheses is that children who are closely spaced to an older sibling in contrast to those who are distantly spaced have more opportunity to compete successfuly with the older sibling, especially in areas where the older sibling is deficient or not interested. Even in areas where the older sibling is successful, a closely spaced younger sibling can at least equal the performance if he or she puts extra effort. Thus the younger sibling learns that working hard, being persistent, and conforming will bring some success in life. The intermittent reinforcement of successes experienced while competing leads the closely spaced younger sibling to be ambitious and to strive hard. On the other hand, the distantly spaced younger siblings,because of the greater difference in developmental level, cannot compete fairly with their older siblings, so that it is more likely that they will emulate and model their older brother or sister. Since

first children tend to have more favorable intellectual climates when they are born and to lead intellectually, distantly spaced second children would also tend to follow the same path and to excell academically. In contrast the closely spaced second child will try to do well in areas other than the academic one.

Method

Subjects

The sample for this study was drawn from participants in an extensive study of families in four suburban communities near Boston (Nuttall and Nuttall,1975). The study focussed on family size and child spacing effects. Small families were defined as consisting of two children, and large families, as having five or more. The 537 families involved in the study were white, intact, with a median of 15 years of completed education, and a median income of $24,000. Some 50 percent of the mothers with two children worked either full or part-time while only 28% of the mothers with five or more children did. All the children involved in the study were teenagers, ranging in age from 13 to 18, attending either junior or senior high school. The present analysis included 233 boys and 300 girls.

Instruments and Procedures

Spacing was measured in two ways. One ~~was~~ was spacing to the next oldest (Space-Old); the other was spacing to the next youngest (Space-Young). These two spacing measures were somewhat different in that for a middle child they focus on his spacing to the next oldest sibling and on spacing to the next youngest sibling. For the Space-Old measure, first born children were omitted from the analysis. For the Space-young, the youngest child was omitted from the analysis. Thus in a two-child family, the oldest child was involved in the Space-young analyses, while the youngest child would be involved only in the Space-Old analyses. These spacing measures were trichotomized into three

categories: close (18 months or less), medium (19 to 30 months),and distant (more than 30 months).

Social participation was obtained by examining the number of clubs and organizations these teen-age children belonged to and their extent of participation in them. The clubs were divided into athletic teams and clubs and all other clubs.

Intelligence scores were obtained from the school records and were converted (when necessary) to a common scale with a mean of 100 and a standard deviation of 16. For the analyses here, the intelligence scores were trichotomized into three groups of 80 to 105, 106 to 120, and above 120.

A measure of job orientation for these teen-agers consisted of a question asking how important it was to get a job now. Children who said it was not important to get a job now were considered to be more oriented to school than to joining the labor force.

Each child was presented with a list of some 70 occupations and was asked to pick which one came closest to the occupation he or she hoped to follow. A child was allowed to write in an occupation if the one he or she was planning to enter was not on the list. Each occupation was then coded on a social status scale with seven being the highest level and one being the lowest. For the analyses here, this occupational aspiration scale was dichotomized at level four or less versus level five or above, roughly corresponding to working class or lower white collar (e.g., elementary school teacher) versus professional (e.g., lawyer, physician, business executive).

Academic motivation was operationalized with the Test of Effective Academic Motivation (TEAM), developed by G. Smith (1970). This is a

self-report questionnaire of 300 items which contains measures of the following personality factors related to academic achievement: (a) Feels Valued, (b) Obedient and Law Abiding, (c) Works Hard and Effectively, (d) Feels Capable, (e) Confident Academically, (f) Self-Sufficient, (g) Likes School and Intellectual Activities, and (h) Ambitious. These factors comprised those aspects of personality that have been found to be dependably related to academic performance.

Other measures used were the Cattell High School Personality Questionnaire (HSPQ) (Cattell and Cattell, 1969), and the Dogmatism Scale (Rokeach, 1956).

Results

Intelligence - As expected from the Zajonc amd Markus model, the more closely spaced children tended to score lower on intelligence measures. The results, reported separately for large and small families, are given in Table 1. Due to the small sample sizes, it was not possible to examine all three spacing categories in the small family children. Among the small families, there was no significant relationship between spacing to the next oldest child and intelligence, while among the large family children there was a strong, and significant, effect, with the younger children who were more closely spaced to their next oldest sibling tending to be less intelligent. A one-way analysis of variance was conducted with these data for the large families and found a significant (.001 level) linear trend for the more closely spaced children to obtain lower scores on the intelligence measures.

Insert Table 1 about here

A two-way analysis of variance with the factors of spacing and family size and intelligence as the dependent variable found a significant effect for spacing ($p < .02$) but no significant effect for family size ($p < .52$). The interaction between spacing and family size was nearly significat ($p < .08$).

Analysis of the mean differences indicated that the closely spaced children averaged 4.23 lower in I.Q. points than the entire sample while the 28 to 36 months spaced children averaged 3.00 I.Q. points higher. Thus spacing was related to a seven point I.Q. differential. The eta coefficient was .19 indicating that about 3.6 percent of the observed variations in I.Q. scores is related to the child spacing variable.

For the intelligence variable, the spacing to the next youngest child was also examined. Here only children who had younger siblings were included in the analysis, and the three spacing categories were examined for both large and small families. The sample size for large and small families is presented in Table 2. Again, there was no significant effect of spacing distance for the two-child family children, but for the large family children, a child tended to be more intelligent the greater the distance was between himself or herself and the next youngest sibling. Only 23 percent of the large family children who were closely spaced had an I.Q. of above 120, in contrast to 32 percent of the distantly spaced children. These findings yielded a X^2 of 13.42 (4df), $p < .05$. It can be concluded that at least among large families, older siblings who are widely spaced from their younger siblings tend to be more intelligent.

Insert Table 2 about here

Athletic Teams

Using the total sample, we found that the spacing of a child to the next oldest sibling was related to the number of athletic teams to which he or she belonged. When analysis was conducted separately for each family size, the effect was significant beyond the .02 level for children from small families, but was not significant for children from large families. These data indicate that in small families the closely spaced younger siblings tended to be more athletically inclined than children who were more distantly spaced from their older siblings. Indeed, the median number of team memberships was more than twice as many for the closely spaced younger children than for the medium or distantly spaced younger children. While 50 percent of the closely spaced children belonged to four or more teams, only 21 percent of the distantly spaced children did ($X^2 = 19.32$ (8df), $p < .02$.

Importance of Getting a Job Now

The desire of a child to get a job now, and implicitly the lesser importance of staying in school, was significantly related to spacing to the next oldest child for the total sample ($p < .02$), but, when analyzed separately by family size, the effect was significant only for the large family children. Seventy-eight percent of the closely spaced to the next oldest sibling children felt that it was extremely important to get a job now, while only 60 percent of the medium and distantly spaced children did (X^2 (2 df)= 7.05, $p < .03$). These results indicate a tendency for large family children who are closely spaced to an older sibling to be more interested in getting a job now than were large family children who were more distantly spaced from an older sibling.

Occupational Aspiration

The occupational aspiration level was significantly related to spacing to the next oldest child for the total sample and for both family sizes. Seventy-six percent of the children closely spaced to the next oldest aspired to high prestige occupations, while 57 percent of the distantly spaced children did (X^2 (2 df) = 8.64, $p < .01$).

When the analysis was conducted separately by size of family, in the small families the percentages of children aspiring to occupations rated five or above were 100 percent of the closely spaced, 88 percent of the medium spaced, and 60 percent for the more distantly spaced. For the large family children, the respectives percentages were 75, 60, and 53. Clearly it was the children more closely spaced to an older sibling who were aspiring to higher occupations. This is the opposite conclusion from what might be expected from the intelligence findings.

Test of Effective Academic Motivation (TEAM)

A multivariate analysis of variance was conducted with family size and spacing to the next oldest child as independent variables and with the eight TEAM factors as dependent variables. There were no interactions between family size and sibling spacing, and the effects of sibling spacing were significant beyond the .009 level for the total sample.

There was,however, only one TEAM factor which was significant in the univariate analyses, that of Self-Sufficient. This was significant at the .01 level. In addition, there were univariate non-significant trends for Feels Valued, Obedient, and for Ambitious. The means for the eight TEAM factors for the three spacing to the next oldest sibling groups are presented in Table 3.

Insert Table 3 about here

The factor which was significant, Self-Sufficient, indicates a clear trend, with the younger children more distantly spaced from the next oldest being less self-sufficient than were young children who were very closely spaced behind an older sibling. The standard deviation for the Self-Sufficient factor was 38, so the difference between the most distantly spaced and the most closely spaced children was about a third of a standard deviation.

The multivariate step-down F in the last column gives a measure of the significance of the spacing effect on each TEAM factor, while controlling for the TEAM factors which are above it in the list. This column indicates that Obedient and Feels Capable exhibit some spacing effect as well as does Self-Sufficient. For Obedient, the younger children closely spaced to their next sibling were more obedient than were the middle or more distantly spaced younger children. On the other hand, it is the middle spaced children who were more likely to feel capable.

When the multivariate analysis of variance was conducted on only small family children, it failed to achieve significance. However, when the analysis was conducted on only the large family children, it was significant at the .01 level. Thus the significant effect for the whole sample was due mainly to the power of the spacing effect among the large family children.

As with the entire sample, in large families being quite a distance behind the next oldest child was linked to being less self-sufficient ($p = .01$). Being closely spaced to the next oldest was linked to being

more obedient ($p = .06$), while having a middle spacing was linked to higher degrees of feeling capable ($p = .01$). There was also a trend indicating that the more distantly spaced children felt more valued ($p = .13$).

Cattell High School Personality Questionnaire (HSPQ)

The HSPQ instrument produces 14 factors or personality scales, with one of them, Factor B, being a ten item vocabulary test of intelligence. Among small family children there were no significant spacing effects, but among the large family children a multivariate analysis of variance indicated that there was a significant association (.04 level) between the HSPQ and spacing. The greater the distance between the younger child and the next oldest child, the more intelligent, more happy-go-lucky and more controlled and affected by feelings the younger child was. These were the factors: B (Intelligence), C (Ego Strength), F (Enthusiasm), and Q3 (Willpower). Those children in a large family who had older siblings fewer than 19 months older than themselves tended to be less intelligent, more emotionally stable, more sober and serious, and yet more careless of protocol than were children with more spacing between themselves and their older siblings.

Other Personality Scales

When spacing to the next oldest child was tested separately for each family size using multivariate analysis of variance with the personality variable Dogmatism, there were no significant effects for either family size sample. However, there was a significant effect (.05 level) for spacing to the next youngest sibling among large family children on the F-scale of Authoritarianism. The relationship was linear: the closer the next youngest child was, the more authoritarian the older child became.

Thus spacing yielded some interesting findings in the personality realm. Among large family children who were closely spaced, the older child of the pair tended to be more authoritarian, while the younger child of the pair tended to be less intelligent, more sober, more emotionally stable, and more careless of protocol.

Discussion

The results of this study lend credence to the thesis of Zajonc and Markus that the more closely spaced younger children would tend to be less intelligent. On the other hand, the closely spaced younger children were members of more athletic teams, seemed more interested in obtaining an occupation, and were more ambitious occupationally. These closely spaced children tended to be more self-sufficient, perhaps more obedient, more emotionally stable, more sober and serious, and more relaxed about protocol than were those children with a greater distance from their next oldest sibling.

Most of these findings were significant only among the large family children, and spacing seemed to have much less effect in the two-child families. Thus two-child families, because of their ability to provide one-to-one parent-child interaction, provide a more similar athosphere regardless of the spacing.

On the whole, additional models need to be developed for the effects of spacing and family size on occupational aspirations, social competence, and other aspects of personality. Some speculations on possible causal relationships are that, when children are closely spaced, they tend to play together and to treat each other more as equals. When they are more distantly spaced, the younger child has a much harder time being accepted and competing successfully with an older sibling.

Furthermore, the younger child in a closely spaced pair has more opportunity to compete on fair grounds since the other child is just a little older. This learned competitiveness, coupled with the close association, should lead to greater ambition and yet also to an ability to play on teams and to respect himself or herself. Thus the closely spaced younger child, in shying away from academic competition with his older sibling, cultivates other traits which lead to later life success. Thus a closely spaced younger sibling develops a coping style characterized by self-sufficiency, ambition, high occupational interest, effectiveness as a group member, obedience, seriousness, and emotional stability, while the more distantly spaced child tends to concentrate more in the academic area and to lack these traits.

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Table 1

Intelligence by Spacing to Next Oldest for Small and Large Family Children

	Small Families		Large Families		
Intelligence Quotient Ranges	30 or Less (N=15)	31+ (N=51)	18 or Less (N=45)	19-30 (N=35)	31+ (N=49)
80 - 105	7%	25%	36%	20%	14%
110 - 120	47%	47%	51%	37%	49%
Above 120	47%	27%	13%	43%	37%

Chi-Square (2 df) = 3.28

Probability Not Significant

Chi-Square (4 df) = 12.49

Probability less than .02

Table 2

Number of Children in Small and Large Families

by Three Spacing to Next Youngest Categories

Spacing Categories	Small Families	Large Families
10 months or less	6	42
19 to 30 months	13	46
more than 30 months	61	68

Table 3

Means for Team Factors on Three Spacing to Next Oldest Categories

Spacing next oldest sibling, Total Sample

TEAM Factor Names	18 months or less (N=92)	19 to 30 Months (N=114)	More than 30 Months (N=141)	Univariate Significance Level	Stepdown F Significance
Feels Valued	302	300	311	.18	.18
Obedient	262	253	253	.17	.07
Works Hard	275	269	273	.53	.92
Feels Capable	267	274	268	.26	.01
Confident Academically	266	269	266	.37	.27
Self-Sufficient	268	264	256	.01	.01
Likes School	265	261	258	.58	.94
Ambitious	301	300	311	.20	.24